

NRC INSPECTION MANUAL

FCSE

INSPECTION PROCEDURE 88135 ATTACHMENT 05

RESIDENT INSPECTION PROGRAM
FIRE PROTECTION
(ANNUAL/QUARTERLY)

88135.05-01 INSPECTION OBJECTIVES

01.01 The objectives of this procedure are to provide requirements and guidance for evaluating the operational status and material condition of the licensee's fire protection systems. The evaluation is to determine whether the following aspects of the licensee's fire protection capability meet U.S. Nuclear Regulatory Commission (NRC) issued license requirements, and are adequate to preclude or mitigate the consequences of a fire:

- a. Effectiveness of control of combustibles and ignition sources within the plant;
- b. Operability of fire detection and suppression equipment and systems;
- c. Material condition of passive fire protection features;
- d. Effectiveness of compensatory measures in place for out-of-service, degraded or inoperable fire protection equipment, systems or features; and
- e. Performance of the fire brigade.

NOTE: Inspectors shall utilize Inspection Procedure, 88135.05, "Fire Protection (Annual)" when the triennial inspection is scheduled, as necessary, for verification of code and license requirements. The annual inspection complements the triennial inspection by focusing on the material condition and operational status of the fire protection program, specifically in the areas of active fire detection/suppression systems and passive fire confinement. During the calendar year in which the triennial is scheduled, all inspection time shall be charged to the triennial inspection procedure.

88135.05-02 INSPECTION REQUIREMENTS AND INSPECTION GUIDANCE

02.01 Quarterly Inspections.

- a. Inspection Requirement. On a quarterly basis, perform a walkdown of plant areas important to safety and evaluate for fire protection requirements.
- b. Inspection Guidance. Do not attempt to address all plant areas during each inspection. It is expected that the residents perform the number of walkdowns necessary to assure themselves that fire protection requirements are being met. The main focus of the quarterly inspections is on the material condition and operational status of fire detection and suppression systems and equipment, and fire barriers used to prevent fire damage or fire propagation.

The selection of fire protection features to be reviewed depends on the specifics of each licensee's program. Fire protection requirements for licensees greatly vary because of the significant differences in operations at fuel cycle facilities and thus any safety or security impact from fire. Therefore, the inspector should, as part of inspection preparation, review fire protection program documentation specific for the licensee to be inspected. This review should include a review of changes to the program since the last inspection. Specific requirements are documented in the regulations, the license, the Safety Analysis Report (SAR), the Integrated Safety Analysis (ISA), licensee policies and procedures, or Fire Hazards Analysis (FHA).

In addition, in preparation for the inspection, the inspector should discuss with the project inspector and resident inspection staff, where applicable, any fire protection equipment availability or reliability problems (such as recurring failures or failures resulting in reportable events) the licensee has experienced since the last annual inspection.

Select from this list the fire protection issues that could impact the more risk-significant operations to review during the inspection. Once on site, the inspector should initially determine what hot work, welding, or cutting is scheduled to be performed by the licensee during the period of the inspection. From this, the inspector should select sample activities to observe during the inspection. The inspector should use the ISA Summary or other safety analysis to determine the risk-significant operations. The inspector should inform a licensee representative that he/she would like to be kept informed of any change in the schedule of this work to ensure that an inspector observes the work.

The inspector should note the material condition and operational status (rather than the design) of fire detection and suppression systems and fire barriers used to prevent fire damage or fire propagation.

For those fire protection structures, systems, and components installed to satisfy NRC requirements, and designed to National Fire Protection Association (NFPA) codes and standards, the code edition in force at the time of the design and installation is the code of record to which the design is evaluated.

Deviations from the codes should be identified and justified in the license application or FHA. A licensee may apply the equivalency concept in meeting the provisions of the NFPA codes and standards. When the licensee states that its design “meets the NFPA code(s),” or “meets the intent of the NFPA code(s)” and does not identify any deviations from these codes, the NRC expects that the design conforms to the codes, and therefore the design should be inspected against the NFPA codes.

The Director, Office of Nuclear Material Safety and Safeguards (NMSS), NRC, or designee is considered the to be the authority having jurisdiction as described in NFPA documents.

The inspector will tour plant areas containing safety controls and items relied on for safety (IROFS) to assess the material condition of active and passive fire protection equipment, systems, and features, and check their operational lineup and readiness. The focus of the inspection should be coordinated with the project inspector and the resident inspector, and take into account previous inspection reports, to minimize overlap. However, the inspector may decide that it is appropriate to apply inspection time to similar areas because of the risk-significance of the areas.

02.01 Control of Transient Combustibles and Ignition Sources.

- a. Inspection Requirement. Determine whether the licensee controls transient combustibles and ignition sources in accordance with licensee procedures.
- b. Inspection Guidance. Metals such as uranium and zirconium, and their alloys, are known to be combustible, especially when in a finely divided form. Through interviews with personnel, review of maintenance and operational logs, and observation of fire protection equipment as well as work in progress, determine that:

1. General

- (a) Transient combustible materials are being controlled in accordance with the licensee's procedures.
- (b) Hot work, welding, or cutting is being done in accordance with the licensee's procedures.
- (c) The facility work planning process organization is familiar with specific locations where changes in plant conditions have occurred that required fire protection compensatory measures to be put in place (e.g., for inoperability of fire detection or suppression systems), and that the organization understands what adjustments are needed in planned work to minimize the introduction of combustibles or ignition sources (that could increase the likelihood of a fire or increase fire severity) into plant areas where degraded fire protection features or systems exist.
- (d) The work planning process organization accepts responsibility for storage and handling of pre-staged work materials, including flammable and hazardous materials that are included in the pre-stage request.
- (e) Flammable/combustible liquid storage areas and floor drain systems in selected plant areas that could affect plant safety controls and IROFS are identified and the necessary precautions understood.
- (f) Flammable/combustible liquid spills, leakage or explosions associated with oil storage areas, large oil-filled transformers or batteries in or adjacent to the areas selected for inspection are identified and the necessary precautions understood.

2. Machining Operations of Combustible Metals

- (a) Machining operations in the facility such as sawing, grinding, machining, and abrasive cutting which have the potential for combustible dust cloud formation and combustible scrap and swarf accumulation, are adequately controlled. Fire protection measures for these metals are similar. NFPA 484, "Standard for Combustibles Metals," provides guidance.
- (b) No open flames are permitted in the areas where machining operations of combustible metals are performed. If maintenance operations, such as welding, are to be performed in the vicinity, machining operations should be halted, and metal scraps should be removed.
- (c) Machining operations on combustible metals are performed in enclosures with a dust-collection system in operation. The collected dust should be ducted to a dust collector and a HEPA filter, if required, for removal of radioactive particles. The collection hood and duct leading to the filter should be designed to minimize deposition of the fines and to facilitate cleaning.

- (d) Scrap and swarf generated by machining operations and accumulated in the immediate area are swept as frequently as necessary and collected under water in covered metal containers. Such collections should be removed daily from the process areas. Dust and sludge collected in the dust separators and ducts should be removed as often as necessary.
 - (e) Extinguishing agents suitable for the particular metal fire, as well as suitable scoops or applicators, are readily available to the operator performing the machining.
- 3. Incinerators
 - (a) Incinerators are separated from the remainder of the facility by fire barriers having a minimum 1-hour fire resistance rating.
 - (b) The exhaust from an incinerator that is used to burn radioactive contaminated waste is ducted to a filtration system before release to the environment. The exhaust may also be ducted to the facility off-gas system.
- 4. Boilers and Boiler Furnaces
 - (a) Boilers for the supply of steam for process operation and boiler furnaces are separated from the remainder of the facility by fire barriers having a minimum 1-hour fire resistance rating.
 - (b) The fuel storage tanks are separated from the furnace area by fire barriers having a minimum 1-hour fire resistance rating, and the fuel lines are laid out to minimize the possibility of damage.
- 5. Stationary Combustion Engines
 - (a) Stationary combustion engines located in part of a structure housing fuel processes are in enclosures having a fire resistance rating of at least 1 hour.
 - (b) Fuel storage tanks, except for day tanks are located outside the room.
 - (c) The engine exhaust system will prevent ignition of any combustible material by contact with hot metal surfaces or by leaking exhaust gases or sparks.
- 6. Storage and Handling of Flammable and Combustible Liquids and Gases
 - (a) Indoor storage of flammable and combustible liquids is only permitted in limited quantities in approved closed containers for the purpose of day-use (such as for diesel engine operation) and maintenance work.
 - (b) Appropriate portable fire extinguishers are available in the affected area.

02.02 Fire Detection Systems.

- a. Inspection Requirement. Determine whether the physical condition of the fire detection devices is adequate, and note any that show physical damage, blockage, or potential interference with functionality.
- b. Inspection Guidance.
 - 1. Confirm operators receive visual and audible indication, either from a control room or at a central staffed location, that a fire detection system has been activated.
 - 2. Confirm operators receive indication of where the activated fire detection system is located.
 - 3. Confirm each fire detection panel receives power from two different sources.
 - 4. Confirm all fire detection circuits are electronically supervised to provide indication (trouble alarm) of any identified faulted condition.

02.03 Water-based Fire Suppression Systems.

- a. Inspection Requirement. Determine whether the licensee carries out its responsibility for maintaining suppression systems available, operable, and in proper material condition.
- b. Inspection Guidance.
 - 1. Confirm operators receive visual and audible indication, either from a control room or at a central staffed location, that the water-based fire suppression system has been activated.
 - 2. Confirm operators receive indication of where the activated water-based fire suppression system is located.
 - 3. Confirm operators have written procedures available to indicate what actions are required to manually place the water-based fire suppression systems into operation.
 - 4. Confirm operation of the water-based fire suppression system is not unacceptably impaired if the system is actuated by the fire detection system and the fire detection system is inoperable, reacts too slowly, or its critical detection attributes are degraded.
 - 5. Confirm water supply control valves to the system are open and the fire water supply and pumping capability is operable and capable of supplying the water supply demand of the system. (Verify through visual observation or surveillance record.)
 - 6. Confirm the system provides adequate water spray/sprinkler coverage for the in situ hazard the system is protecting.

7. Confirm sprinkler heads and nozzles are not missing, not the wrong type, and are not obstructed by major overhead equipment (e.g., ventilation ducts). A minimum of 18 inches of clear space below the sprinkler deflector shall be maintained.
8. Confirm material conditions such as mechanical damage, painted sprinkler heads, corrosion, etc., will not affect performance of the system.
9. Confirm adequate drainage is provided in areas protected by water suppression systems. Verify that a protected room or area has a proper floor drainage system (floor drains are not restricted with debris, plugged, or blanked off) in areas where either water-based fixed suppression systems or manual fire brigade hose streams are expected. Determine whether these fire suppression activities could impact operation of critical equipment safety controls (e.g., sprinkler-caused flooding of other safety controls).
10. Confirm building modifications for the fire suppression system have not compromised the effectiveness of the suppression system.
11. Confirm any modifications to the sprinkler system (i.e. additional sprinklers to cover an additional hazard) do not degrade the hydraulic performance of the original designed system. (Review hydraulic analysis of modification.)

02.04 Gaseous Fire Suppression Systems.

- a. Inspection Requirements. Determine whether the licensee maintains suppression systems available, operable, and in proper material condition.
- b. Inspection Guidance.
 1. Confirm operators receive visual and audible indication, either from a control room or at a central staffed location, that the gaseous fire suppression system has been activated.
 2. Confirm operators receive indication of where the activated gaseous fire suppression system is located.
 3. Confirm operators have written procedures available to indicate what actions are required to manually place the gaseous fire suppression system into operation, and that they know how to use them.
 4. Confirm that the system design ensures that if the gaseous fire suppression system is actuated by the fire detection system and the fire detection system is inoperable, reacts too slowly, or its critical detection attributes are degraded, compensatory actions are in place to ensure that the operation of the associated gaseous fire suppression system is not impaired.
 5. Confirm that the gaseous suppression system (e.g., halon or CO₂) nozzles are not missing, obstructed, or blocked by plant equipment such that gas dispersal would be significantly impeded.

6. Confirm that the suppression agent charge pressure is within the normal band, extinguishing agent control system actuation supply valves are open, extinguishing agent main supply valves are open and the system is in the appropriate standby mode.
7. Confirm that where applicable, dampers/doors are unobstructed so that they will be permitted to close automatically upon actuation of the gaseous system.
8. Confirm that fire barrier penetration seals, where applicable, are sealed and in good condition.
9. Confirm the room enclosure's ability to maintain gas concentration is not degraded (e.g., worn-out fire door weather stripping, minimal penetration seal degradation or minor cracks, no ventilation system isolation, removed or missing dampers), or more leakage paths than originally tested.
10. Confirm that material conditions such as mechanical damage, corrosion, damage to fire doors; electric thermal or pneumatic link actuators; fire dampers; or open penetrations that may affect the performance of the system will not hinder safe operation of the plant.

02.05 Manual Firefighting Equipment and Capability.

- a. Inspection Requirements. Determine whether the licensee maintains firefighting equipment at designated locations and in proper material condition.
- b. Inspection Guidance. Components to be inspected include: yard fire hydrants, hydrant hose houses, portable fire extinguishers, and hose racks. Visually inspect the physical condition and structural integrity of each hydrant hose house and other components listed in the licensee's fire protection program. Observe and visually verify that equipment required by the licensee's program procedures is present in each specified location, and is in place and in proper working condition. Determine whether:
 1. Hoses have a hydrostatic test date which will not exceed one year.
 2. Firefighting foam containers have a shelf life date, which has not be exceeded or expired.
 3. Hoses do not have signs of damage or deterioration.
 4. The fire hydrant and equipment stored with the Firefighting foam is in proper working condition (i.e., visually inspect that it operates smoothly, and is free of obstructions).
 5. Portable fire extinguishers are provided at their designated locations in or near the area being inspected, and access to the fire extinguishers is unobstructed by plant equipment or other work related activities.
 6. The general condition of fire extinguishers is satisfactory (e.g., pressure gauge reads in the acceptable range, nozzles are clear and unobstructed, charge test records indicate testing within the normal periodicity).

7. Fire hoses are installed at their designated locations and the general condition of hoses and hose stations is satisfactory (e.g., no holes in or chafing of the hose, nozzle not mechanically damaged and not obstructed, valve hand wheels in place and operable).
8. The attached 100 feet of fire hose (plus the 30 feet for water stream) covers the complete area including the overhead. Verify that the hose is properly connected to the standpipe hose connection, and is properly placed on the hose rack. Verify that the shutoff valve is closed, hand wheel is in place, and valve is not leaking (e. g., compress the first hose section from hose connection to rack for signs of water in the hose).
9. There is a properly calibrated/adjusted pressure reduction device, if installed (25 percent or less calibration/adjustment error).
10. Any fire hoses in the hose rack are damaged. Verify that the exterior of the hose jacket is dry with no signs of excessive dirt, debris, cuts, abrasions, or other obvious damage.
11. The hose rack swings freely. Verify that hose rack, hose station piping, and supports in the general area have no excessive rust and corrosion.
12. Damaged, missing, clogged, or incorrect nozzles (non Underwriters Laboratories/Factory Mutual (UL/FM) electric safe nozzles) are attached to the system.
13. Water supply control valves to the standpipe system are open and the fire water supply and pumping capability is operable and capable of supplying the water flow and pressure demand.
14. Access to the hose stations is unobstructed by plant equipment or work-related activities.

02.06 Passive Fire Protection Features.

- a. Inspection Requirements. Determine whether components such as fire doors, fire dampers, fire barrier penetration seals, oil collection systems, and electrical raceway fire barrier systems (ERFBS) are maintained in a proper material condition.
- b. Inspection Guidance.
 1. Fireproofing
 - (a) Determine whether evaluations and/or fire tests that were performed to verify that each type of fireproofing will maintain the integrity of structural members for the time specified, have not been invalidated by plant changes. (See the UL Fire Resistance Directory.)
 - (b) Determine whether structural steel fire proofing, such as fibrous or concrete encapsulation, is installed in such a way that the structural steel is uniformly covered (no bare areas).

- (c) Determine whether fire ratings of fireproofing systems are compatible with the anticipated fire duration and intensity. Verify through observation that no physical damage exists which would affect the structural integrity of the fire proof material and allow a direct path for flame/hot gas travel to the protected component (i.e., loose or sagging fire proof material wrap, water damage, loose bands, etc.).

2. Fire Doors

- (a) Determine whether evaluations and/or fire tests were performed to verify that each type of fire door will maintain the integrity of structural members for the time specified. (See the UL Fire Resistance Directory.)
- (b) Determine whether fire doors and frames are UL labeled and the label fire ratings of door assemblies are compatible with the fire ratings of their associated fire barriers.
- (c) Determine whether fire doors close freely (without dragging or sticking) and door latch hardware engages and latches securely. Generally, for the metal doors encountered during inspections, a 3-hour door needs a 5/8 inch latch throw and a 1-hour door needs 1/2 inch latch throw. (Refer to NFPA 80 if an issue arises).
- (d) Determine whether the fire door frame and door to floor clearance gaps are not excessive (do they exceed the criteria of NFPA 80).

3. Ventilation Fire Dampers

- (a) Determine whether material conditions of ventilation system fire dampers including fusible links, where applicable, ensure unobstructed operability. For those dampers, which cannot be readily observed in the selected plant areas, review the licensee's surveillance efforts directed towards verifying the continuing operability of ventilation fire dampers.
 - (1) Accessible fire dampers are UL labeled and the label fire ratings of dampers are compatible with the fire ratings of their associated fire barriers.
 - (2) The fire damper has no obvious signs of damage by visual verification. Verify through observation that the fire damper fusible link is properly installed and the fire damper has no obstruction which would prevent closure.
 - (3) The fire damper has no buildup of dirt, dust, oil, rust, or other items on the track or coiled springs that would interfere with proper operation.

4. Penetration Seals

- (a) Determine whether fire ratings for accessible fire penetration seals are compatible with the fire ratings of their associated fire barriers. Visually inspect the physical condition and structural integrity of each penetration within a firewall, floor, or ceiling for the following. Verify by observation that:
 - (1) The penetration has a seal installed and there is NO passage of light or air movement through the sealant.
 - (2) The foamed penetration seal surface has no cracks greater than 1/8 inch in width in the functional portion of the sealant.
 - (3) The foamed penetration seal surface has no holes greater than 1 inch in depth in the functional portion of the sealant.
 - (4) There are no tears or rips in the functional portion of the sealant. Cables pulled away from the seal do not result in cracks >1/8 inch in width, holes > 1 inch in depth or tears or rips in the functional portion of the sealant.
 - (5) There are no open (unsealed) conduits or open pipes protruding through the seal and terminating on either side of the fire barrier.
 - (6) The damming boards, when installed, such as Carborundum™, Duraboard®, Durablanket®, or Masonite board are an integral part of the seal. Verify that the damming boards and seams or TSI material is undamaged and in its originally installed condition.

5. Electrical Raceway Fire Barrier Systems

- (a) Determine by observation that ERFBS required to provide necessary power for safety controls or IROFS, such as cable tray fire wraps for cables and blanket material, are in good condition. Visually inspect the physical condition and structural integrity of each ERFBS to confirm the following:
 - (1) Wrap materials are continuous and attached securely in place. In particular, check that material joints or seams are not separated from attachments or have gaps at the firewall structure.
 - (2) No exposed metal is present which might act as a thermal short-circuit from structural supports (i.e., all attachment supports, stud bolts, nuts, and washers are properly covered with the fireproofing material).
 - (3) Banding, wire tie, and other fastener pattern and spacing appears appropriate.
 - (4) No breaks, tears, cracks, or holes are present.

- (5) No crumbling of material is present.
- (6) No water damage has occurred.
- (7) No sagging is observed.
- (8) No blisters or bubbles are present.

6. Oil Spill, Leakage and Containment/Collection Systems

- (a) Oil leakage and containment/collection systems are fire protection features designed to collect oil leakage, spills, and spray from equipment and/or storage tanks that contain flammable or combustible liquids (See NFPA 30, "Flammable and Combustible Liquids Code"). Visually inspect the physical condition and structural integrity of each oil leakage and containment/collection system for the following:
 - (1) The oil leakage and containment/collection system has sufficient volume for collecting and holding the contents from the largest container allowed to prevent overflow from endangering important structures, facilities, or safety systems.
 - (2) The containment/collection containment dike is liquid tight.
 - (3) Any piping passing through the dike walls has closed isolation block valves installed. Verify that the valve(s) access under fire conditions is permitted without entering the diked area. Where provision is made for draining water from diked areas, the drains should be controlled to prevent combustible liquids from entering areas where they would constitute a hazard to important structures, facilities, or safety systems.

02.07 Compensatory Measures.

- a. Inspection Requirements. Determine whether compensatory measures are put in place by the licensee for out-of-service, degraded or inoperable required fire protection equipment, systems or features.
- b. Inspection Guidance. The use of compensatory measures, on a short-term basis, is an integral part of licensees' fire protection programs. In most cases, such measures can effectively compensate for the reduction in the level of fire protection defense-in-depth until the operability of the degraded or inoperable fire protection feature can be restored, or the nonconformance can be corrected. For typical fire protection system deficiencies (e.g., inoperable fire detection and suppression systems) the plant administrative procedures should specify the appropriate compensatory measures.

Each level of defense in fire protection (i.e., prevent fires, detect and suppress fires, and the design of safety systems to limit fire damage), should meet certain minimum requirements; however, strengthening any one can compensate in some measure for weaknesses, known or unknown, in others. In some cases, reductions in defense in depth can be immediately corrected. For example, combustibles can be removed if

found in a combustible free zone. In other cases, more time is needed to correct the problem (e.g., repair an inoperable fire detection system, or install a missing fire barrier). In still other cases, fire protection features are purposefully removed from service (e.g., a fire barrier penetration seal may be removed to allow a new cable run). When immediate corrective actions cannot be taken, compensatory measures are implemented to mitigate the increased fire risk created by the degraded, inoperable, or nonconforming condition until permanent corrective actions can be implemented.

Fire watches are the most common form of compensatory measure for typical fire protection system deficiencies. Fire watches are personnel trained to inspect for the control of ignition sources, fire hazards, and combustible materials; to look for signs of incipient fires; to provide prompt notification of fire hazards and fires; and, in some cases, to take actions to begin fire suppression activities. The primary purpose of the fire watch is to look for fire hazards and other conditions that could lead to a fire. Therefore, the fire watch strengthens the first echelon of fire protection defense in depth (fire prevention) by compensating for the weakness introduced by the inoperable, degraded, or nonconforming condition.

Fire watches may also detect fires, call out the fire brigade, give exact information regarding the nature and location of the fire to the fire brigade, and initiate fire suppression activities for incipient stage fires. These actions all strengthen the second level of defense in fire protection (fire detection and suppression). (Whether or not a fire watch engages in incipient stage firefighting activities is based on the individuals' training and procedures.) Assess whether:

1. Compensatory measures are put in place by the licensee for out-of-service, degraded or inoperable fire protection equipment that is required to be operable, or inoperable systems or features (e.g., detection and suppression systems and equipment, passive fire barrier features, etc.).
2. Compensatory measures are adequate to provide at least the same reduction in fire risk (considering the out of service time) as the fire protection item(s) for which the compensatory measures are applied.
3. Licensee's plans for permanent corrective actions, and the effectiveness of the corrective actions for returning the equipment to service in a reasonable period of time, are adequate.
4. For identified impaired fire protection features, compensatory actions (usually a posted fire watch) are established and continued until the component is restored.
5. The duties of posted compensatory action fire watchers are adequate, and fire watch rounds are completed within specified procedural time frames.

02.08 Annual Inspection.

- a. **Inspection Requirements.** During the annual observation of a fire brigade drill in a plant area important to safety, evaluate the readiness of the licensee's personnel to prevent and fight fires.

- b. Inspection Guidance. If the drill is not scheduled to take place during the inspection, the inspection requirement may be accomplished by interviewing Fire Brigade members to determine the actions they would take in the event of a fire response. Different fire scenarios should be provided to determine the extent of Fire Brigade training. The following information should be assessed during a drill observation:
 - 1. Protective clothing/turnout gear is properly put on and used.
 - 2. Self-contained breathing apparatus (SCBA) equipment is properly worn and used.
 - 3. Fire hose lines are capable of reaching all necessary fire hazard locations, the lines are laid out without flow constrictions, the hose is simulated as being charged with water, and the nozzle is pattern (flow stream) tested prior to entering the fire area of concern.
 - 4. The fire area of concern is entered in a controlled manner (e.g., fire brigade members stay low to the floor and feel the door for heat prior to entry into the fire area of concern).
 - 5. Sufficient firefighting equipment is brought to the scene by the fire brigade to properly perform its firefighting duties.
 - 6. The fire brigade leader's firefighting` directions are thorough, clear, and effective.
 - 7. Radio communications with the plant operators and between fire brigade members are efficient and effective.
 - 8. Members of the fire brigade check for fire victims and propagation of the fire into other plant areas.
 - 9. Effective smoke removal operations are simulated.
 - 10. The firefighting pre-plan strategies are used.
 - 11. The licensee's pre-planned drill scenario is followed, and the drill objectives acceptance criteria are met.

02.09 Identification and Resolution of Problems.

- a. Inspection Requirements. Determine whether the licensee is identifying safety control or IROFS fire protection operability problems at an appropriate threshold, and entering them into the corrective action program (or equivalent) if required by license requirements.
- b. Inspection Guidance.
 - 1. Program Implementation. Use direct observation of operations, discussions with relevant plant staff, and a sample review of applicable documentation to evaluate the information below. Inspectors should consider licensee identified issues

(e.g., issues identified during audits or self-assessments) and issues identified through an employee concerns program, if applicable:

- (a) Determine whether equipment, human performance, and program issues are being identified by the licensee at an appropriate threshold, and whether the issues are being entered into the problem identification and resolution program.
- (b) Determine whether corrective actions commensurate with the significance of the issue have been identified and implemented by the licensee.
- (c) Determine, if applicable whether the licensee is implementing a program for facility systems inspection (normally done on a shift or daily basis), or other initiatives required by the license conditions and implementing procedures.
- (d) Perform a screening review of items entered into the corrective action program. The intent of this review is to be alert to conditions, such as repetitive equipment failures or human performance issues that might warrant additional follow-up through this inspection procedure, or other core inspection procedures. The purpose is not to document the results of this review, or that to follow-up each item, but to be alert for trends and risk significant or repetitive failures.
- (e) Review a sample of issues identified to determine whether the licensee has appropriately classified the issues identified and has taken appropriate short- and long-term corrective actions.
- (f) Determine whether the licensee has conducted periodic reviews, audits, and assessments to ensure that safety commitments in the license are assessed at an appropriate frequency.

Part 70 licensees are required to maintain records of IROFS or management measures that have failed to perform their function upon demand, or have degraded such that the performance requirements are not satisfied. These records should be readily retrievable and inspected. These records should identify the IROFS or management measure that has failed, and the safety function affected, the date of discovery, date (or estimated date) of the failure, duration (or estimated duration) of the time that the item was unable to perform its function, any other effected IROFS or management measures and their safety function, any processes that were effected, the cause of the failure, whether the failure was a failure of the performance requirements or a failure upon demand or both, and any corrective or compensatory action that was taken. Failures should be recorded at the time of discovery, and the record of each failure updated promptly upon the conclusion of the failure investigation of an IROFS or management measure. (10 CFR Part 70.62(a)(3)).

2. Event Review

- (a) Determine whether the licensee has implemented a program for evaluating safety significant events that meets license requirements. Review the

events that have occurred since the last inspection to determine how the licensee has complied with the license including, as appropriate:

- (1) The prompt review and evaluation of non-routine events and unusual occurrences;
- (2) Assessment of the significance of non-routine events and unusual occurrences, and reporting them, both internally and to the NRC;
- (3) Evaluation of extent of condition findings; and
- (4) Completion of corrective actions related to non-routine events and unusual occurrences.

3. Audits

- (a) Determine if the licensee is required to conduct audits or self-assessments. Select internal or contracted audits performed since the previous inspection, and examine the records documenting selected audits to determine whether there was a written plan for the audit, the audit adequately reviewed the audited area, appropriate corrective actions were taken whenever deficiencies were found, and whether there was a check of the effectiveness of the corrective actions.
- (b) Determine by interviewing the licensee representatives, how the licensee ensures the effectiveness of audits, such as by use of contractor audits, use of a secondary (or follow-up) audit system on a periodic basis, conducted by a member of management or a senior technician not directly responsible for the system audited.
- (c) Determine if safety-significant audit findings are being tracked through completion by the corrective action program, if required.

02.10 Training Compliance with License Requirements.

- a. Inspection Requirements. As applicable, evaluate compliance with license or local procedure and policy requirements relating to implementation of training for operators in the area of fire protection, including:
 1. IROFS or safety controls. As applicable, select a sample of risk-significant administrative safety controls that limit the risk of a credible high consequence and/or intermediate consequence event (10 CFR 70.61(b) and (c)), and determine through interviews whether operators understand why the control(s) are needed to be available and reliable to perform their intended functions (10 CFR 70.61(e)) and whether operators understand why safety controls are required to be available to perform their intended safety functions, consistent with information documented in the Safety Analysis Report.
 2. Fire Safety for Operators. This may include manual fire-fighting techniques or “see and flee” actions. Note that training and fire safety techniques will vary from site to site.

- b. Inspection Guidance. Specific regulatory requirements related to the licensee's training program will be contained in license conditions or in local procedures. In addition, training for administrative controls that are IROFS is required to meet 10 CFR 70.62(d) to ensure the IROFS is available and reliable. The license may require the licensee to implement a training program described in their application.
 - 1. In evaluating the implementation of the approved or required program, pay attention to completion of requirements related to initial training, periodic retraining, on-the-job training, and the results of tests and examination of trainees.
 - 2. Examine a selection of records of initial training for new employees for a variety of workers, including tests and exams (if tests are required by the program).
 - 3. Examine a selection of retraining records for experienced employees for a variety of workers including tests and exams (if tests are required by the program).
 - 4. Discuss the training program with one or more supervisors and one or more operators or technicians, selected at random, to confirm that their participation in the training program is as indicated by their training records.
 - 5. Discuss the program with the licensee's representative who is responsible for training. Discuss any changes made since the last inspection, and confirm that substantive changes were reviewed and approved by management and, if required, by the NRC; review and discuss the licensee's evaluation of the overall effectiveness of the training program. The inspection should be directed at assessing the sufficiency of the training program in addressing the fire safety aspects of hazards that can affect special nuclear material (SNM) at the facility. The principal objective of the training program is to ensure that employees have been adequately prepared to perform their job tasks in a safe and effective manner.

88135.05-03 RESOURCE ESTIMATE

For years where IP 88054, "Fire Protection (Triennial)," is not performed, the resources to complete this inspection are estimated to be 47 hours annually. These 47 hours should consist of 3 hour quarterly samples (a total of 12 hours), and a 35 hour annual inspection.

For years where IP 88054, "Fire Protection (Triennial)," is performed, the resources to complete this inspected are estimated to be 12 hours, consisting of 3 hour quarterly samples. No annual inspection should be performed on these years.

88135.05-04 REFERENCES

04.01 National Fire Protection Association (NFPA) Codes

NFPA 10, "Portable Fire Extinguishers"

NFPA 11, "Low Expansion Foam and Combined Agent Systems"

NFPA 11A, "Medium and High Expansion Foam Systems"

NFPA 12, "Carbon Dioxide Extinguishing Systems"

NFPA 12A, "Halon 1301 Fire Extinguishing Systems"

NFPA 12B, "Halon 1211 Fire Extinguishing Systems"

NFPA 13, "Sprinkler Systems"

NFPA 14, "Standpipe and Hose Systems"

NFPA 15, "Water Spray Fixed Systems for Fire Protection"

NFPA 16, "Deluge Foam-Water Sprinkler and Foam-Water Spray Systems"

NFPA 20, "Centrifugal Fire Pumps"

NFPA 24, "Private Fire Service Mains and Their Appurtenances"

NFPA 30, "Flammable and Combustible Liquids Code"

NFPA 31, "Oil Burning Equipment"

NFPA 37, "Stationary Combustion Engines and Gas Turbines"

NFPA 45, "Laboratories Using Chemicals"

NFPA 50, "Bulk Oxygen Systems at Consumer Sites"

NFPA 50B, "Liquefied Hydrogen Systems at Consumer Sites"

NFPA 51B, "Fire Prevention in Use of Cutting and Welding Processes"

NFPA 54, "ANSI Z223.1-1984, National Fuel Gas Code"

NFPA 69, "Explosion Prevention Systems"

NFPA 70, "National Electrical Code"

NFPA 70B, "Electrical Equipment Maintenance"

NFPA 70E, "Electrical Safety Requirements for Employee Workplaces"

NFPA 72D, "Proprietary Protective Signaling Systems"

NFPA 72E, "Automatic Fire Detectors"

NFPA 75, "Electronic Computer/Data Processing Equipment"

NFPA 77, "Static Electricity"

NFPA 78, "Lightning Protection Code"

NFPA 79, "Industrial Machinery"

NFPA 80, "Fire Doors and Windows"

NFPA 80A, "Protection of Buildings from Exterior Fire Exposures"

NFPA 85D, "Fuel Oil-fired Multiple Burner Boiler Furnaces"

NFPA 86C, "Industrial Furnaces Using a Special Processing Atmosphere"

NFPA 90A, "Air Conditioning and Ventilating Systems"

NFPA 90B, "Warm Air Heating and Air Conditioning Systems"

NFPA 101, "Life Safety Code"

NFPA 204M, "Smoke and Heat Venting"

NFPA 220, "Types of Building Construction"

NFPA 251, "Fire Tests of Building Construction and Materials"

NFPA 321, "Basic Classification of Flammable and Combustible Liquids"

NFPA 482, "Production, Processing, Handling and Storage of Zirconium"

NFPA 600, "Private Fire Brigades"

NFPA 801, "Facilities Handling Radioactive Materials"

NFPA 803, "Light Water-cooled Nuclear Reactors"

04.02 U.S. Nuclear Regulatory Commission Documents

NUREG 0762, "Standard Format and Content for Emergency Plans for Fuel Cycle and Materials Facilities," Rev. 1, November 1987

NUREG 0800, Standard Review Plan 9.5.1, "Guidelines for Fire Protection for Nuclear Power Plants," Rev. 2, July 1981

Draft Regulatory Guide No. DG 3006, "Standard Format and Content for Fire Protection Sections of License Applications for Fuel Cycle Facilities," September 1990

Federal-Register, "Guidance on Management Controls/Quality Assurance, Requirements for Operation, Chemical Safety, and Fire Protection for Fuel Cycle Facilities," Vol. 54, No. 53, March 1989

American National Standards Institute, N665-1985, "Facilities for Fabricating Fuel for Light Water Reactors (LWR) - Fire Protection"

American National Standards Institute/American Society of Heating, Refrigeration, and Air Conditioning Engineers, ANSI/ASHRAE 15, "Safety Code for Mechanical Refrigeration"

American Society for Testing and Materials, ASTM E-84, "Surface Burning Characteristics of Building Materials," 1976

American Society for Testing and Materials, ASTM E-119, "Fire Test of Building Construction and Materials," 1976

Factory Mutual System Approval Guide, "Equipment, Materials, Services for Conservation of Property"

National Fire Protection Association, Fire Protection Handbook

Underwriters Laboratories Standard UL 555, "Standard for Fire Dampers and Ceiling Dampers"

Underwriters Laboratories Standard UL 586, (ANSI B 132.1), "High Efficiency Air Filtration Units"

Underwriters Laboratories, Building Materials Directory

88135.05-05 PROCEDURE COMPLETION

For years where IP 88054, "Fire Protection (Triennial)," is not performed, a total of 47 hours annually, consisting of 3 hour quarterly samples (a total of 12 hours), and a 35 hour annual inspection, will constitute completion of this procedure.

For years where IP 88054, "Fire Protection (Triennial)," is performed, a total of 12 hours, consisting of 3 hour quarterly samples will constitute completion of this procedure.

END

Attachment:
Revision History for IP 88135.05

Attachment 1 - Revision History for IP 88135.05

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional,, Non-Public Information)
N/A	ML13233A174 01/31/14 CN 14-004	IP 88135 was revised in its entirety. ¹ The Attachment 88135.05 is new.	N/A	ML13354B918
N/A	ML18099A294 10/01/18 CN 18-033	Revision includes editorial changes to remove Part 76 certificate holder references and transfer of resource hours from IP 88055 to IP 88135 (Resident Inspector Program)	N/A	N/A

¹ Specific changes include:

- Breakout of inspection requirements into attachments.
- Incorporated specific language requiring that inspection planning be risk-informed.
- Incorporated specific language requiring inspectors to address corrective action program effectiveness when performing inspections.
- Revised format to comply with the requirements of IMC 0040.